

SERVICE INSTRUCTIONS Vulcan Electric Water Heaters TM013



Revision: D

Published: May 09



661 Series
671 Series
691 Series
662 Series

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Introduction

The information provided in these instructions is based on the water heater being installed in accordance with the Installation Instructions provided with each water heater.

Should you require further technical advice on a Vulcan Electric Water Heater, contact your nearest Rheem Service Department where all genuine replacement parts are also available.

Safety Warning

The purpose of this Service Manual is to provide sufficient information to allow a person with the skills as required by the controlling Regulatory Authorities to carry out effective repairs to a Vulcan Electric Water Heater in the minimum of time.

Safety precautions or areas where extra care should be observed when conducting tests outlined in this service manual are indicated by print in ***bold italics*** and/or a warning symbol. Take care to observe the recommended procedure.



“Live” testing to be conducted. Personal Protective Clothing (PPE) shall be worn and an RCD shall be installed between the power point and 3-pin cord of the water heater to reduce the risk of electric shock.



Isolate power before conducting the indicated test



Hot surface or liquid. Personal Protective Clothing (PPE) shall be worn to reduce the risk of scalding.



General warning symbol. Observe the instructions accompanying the symbol.



If the supply cord is damaged, it must be replaced by the manufacturer or its service agent or a similarly qualified person in order to avoid a hazard.

Heater Model Identification

All identification numbers are designed to convey detailed information about the water heater to which it is attached. The model number consists of 8 digits.

	6	6	1	250	0	8	/P
6 - Vulcan							
6 – MEPS compliant							
7 – MEPS compliant right hand water connection							
9 – MEPS compliant dual handed (45 & 50L only)							
1 – Single Heating Unit							
2 – Two Heating Units							
Rated Capacity in Litres							
R – Reduced Diameter							
F – Double Plus							
C – Not fitted 45L							
0 – Not fitted							
2 – 1200w							
4 – 1800w							
5 – 2400w							
6 – 3000w							
7 – 3600w							
8 – 4800w							
9 – 6000w							
/P – Plug In							

Note: Model number, serial number and date of manufacture should be quoted in all correspondence.

Specifications

Model		Rated Capacity (Litres)	T&PR Valve Rating (kPa)	Maximum Inlet Pressure (kPa)		Bottom T/stat Setting (°C)	Water Connections		Bottom T/stat Type	Anode Length (mm)
Series	Capacity			With ECV	Without ECV		Inlet Outlet	T&PR		
661 671 691 662	049	45	1400	960	1120	65	RP ³ / ₄ /20	RP ¹ / ₂ /15	Tradesperson Adjustable	540
	053	50	1400	960	1120	75	RP ³ / ₄ /20	RP ¹ / ₂ /15		490 / 540*
	090	80	1400	960	1120	70	RP ³ / ₄ /20	RP ¹ / ₂ /15		695
	135	125	1400	960	1120	70	RP ³ / ₄ /20	RP ¹ / ₂ /15		1100
	170	160	1400	960	1120	70	RP ³ / ₄ /20	RP ¹ / ₂ /15		1400
	270	250	1000	680	800	70	RP ³ / ₄ /20	RP ¹ / ₂ /15		1153
	340	315	1000	680	800	70	RP ³ / ₄ /20	RP ¹ / ₂ /15		1400
	425	400	1000	680	800	70	RP ³ / ₄ /20	RP ¹ / ₂ /15		1636

NOTES:

671 series available in 80L and 125L capacities only.

691 series available in 45L & 50L capacities only.

Top thermostat on twin element models set at 60°C.

*540mm anode fitted to 661050F and 671050F models only

Preventative Maintenance

It is suggested for peak performance that the water heater be serviced annually.

1. Check for discharge from the T&PR valve. When the element is operating a small discharge of water may be evident. Operate the valve-easing lever to ensure the valve opens and resets properly. Always open and close the valve gently. The T& PR valve should be replaced at 5 yearly intervals.
2. Check for leaks at all tank fittings.
3. Check for signs of excessive corrosion on the water heater jacket.
4. **Isolate power** to the water heater and check all electrical connections for signs of overheating due to poor connection.
5. Conduct an insulation test on the water heater (Refer to page 23).

Operation

Single Element Models

Water temperature is maintained via a thermostat switching the active conductor to an electric immersion element positioned towards the bottom of the cylinder.

When the water temperature within the cylinder falls sufficiently the thermostat contacts close supplying power to the element.

Once the water temperature reaches the set point of the thermostat, the contacts open cutting power to the element.

A double pole 'manual reset' over temperature cut out is incorporated into the thermostat to provide additional protection in the event the controlling thermostat contacts fail. The ECO contacts open between 80°C and 88°C.

Twin Element Non-Simultaneous Models

Water temperature is maintained via two (2) electric immersion elements, one (1) positioned near the top of the cylinder and the other towards the bottom. Only one element is operational at any time (known as non-simultaneous operation).

A thermostat, positioned adjacent to each element is utilized to maintain water temperature.

The top thermostat switches the neutral from the top element to the bottom element, this ensures only one element can be energised at a time. The top thermostat is factory set at 60°C. The bottom thermostat switches the active to the bottom element only.

Both thermostats incorporate a double pole 'manual reset' ECO to provide additional protection in the event the controlling thermostat contacts fail.

Once the top thermostat senses a temperature of approximately 60°C the thermostat contacts open the neutral circuit to the top element (between terminals 1 and 2), causing the top element to be de-energised, and close the neutral circuit to the bottom element (between terminals 1 and 5).

When the water temperature at the bottom of the tank reaches the set point of the bottom thermostat, the thermostat contacts open cutting the active circuit to the bottom element.

Under normal usage the top element is unlikely to operate, the water temperature being maintained by the bottom element. During periods of heavy use when the complete supply of hot water is depleted the top element will operate to maintain the water temperature at the top of the tank.

When the bottom element is connected to an off peak tariff full recovery of the tank will occur whenever power from the off peak tariff is available, usually overnight.

Components and their Function

Temperature and Pressure Relief Valve

A valve designed to provide automatic relief by discharging water in case of excessive temperature, pressure or both.



Never fit a T&PR Valve with a pressure rating greater than that indicated on the product-rating label.

Pressure Limiting Valve (P.L.V.)

A valve that controls its outlet pressure to a predetermined limit.

Outlet Delivery Tube (Dip Tube)

A plastic tube installed in the hot water outlet of the water heater cylinder to conduct water from the highest point to the outlet connection. It also acts as a fitting liner.

Inlet Delivery Tube (Dip Tube)

A plastic tube installed in the cold water inlet of the water heater cylinder to assist with stratification. It also acts as a fitting liner.

Diffuser

A plastic device installed in the cold water inlet of the water heater cylinder to assist with stratification. It also acts as a fitting liner.

Fitting Liner

A plastic tube installed in the cold-water inlet of the water heater to provide protection against corrosion throughout the life of the water heater.

Anode (Sacrificial)

A metal alloy electrode installed in the water heater cylinder that by galvanic action protects the cylinder from corrosion.

Thermostat

A device, responsive to temperature, which controls the supply of electrical energy to the element to maintain the stored water at the required temperature.

Non-simultaneous (Top) Thermostat – Twin Element Models

A device, responsive to temperature, which controls the supply of electrical energy to the top element to maintain the stored water at the required temperature. It also switches the neutral supply between the top and bottom elements to ensure only one element can be operational at any time. This is known as non-simultaneous operation.

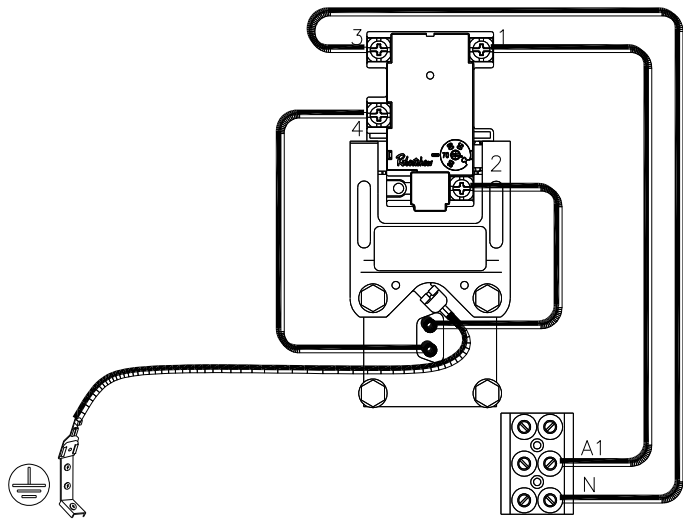
Over Temperature Energy Cut out (E.C.O.)

A temperature-sensing device in combination with the thermostat that automatically cuts off the supply of electrical energy to prevent excessive water temperature occurring. This device will not reset automatically but may be manually reset once temperatures have fallen to a safe level. ***DETERMINE CAUSE OF OPERATION.***

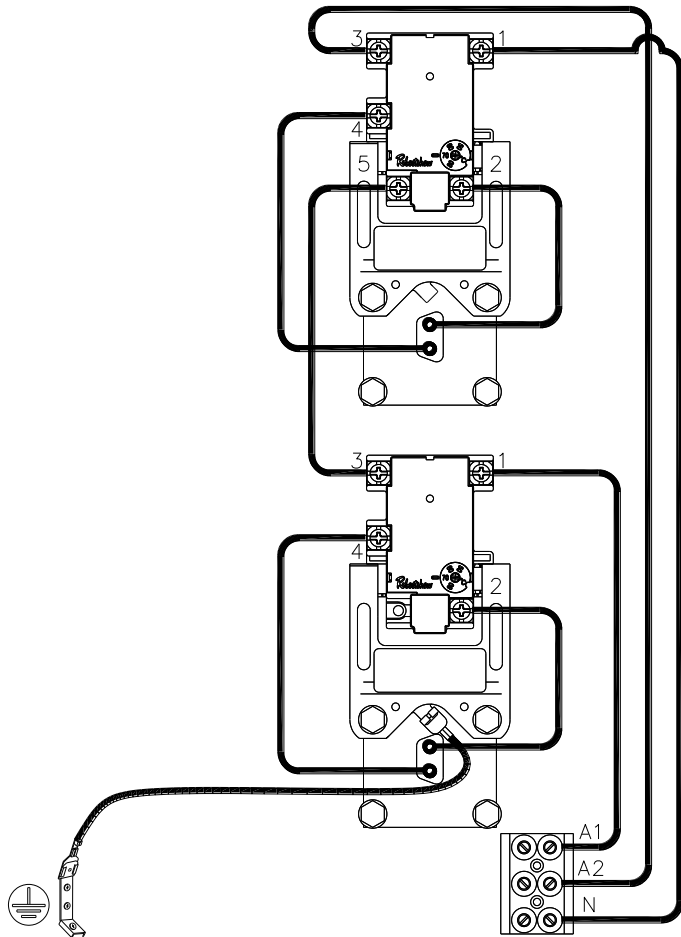
Heating Unit (Element)

A tubular device containing an electric resistance element that converts electrical energy to heat. Standard ratings are 1.2, 1.8, 2.4, 3.6, 4.8 and 6.0kW.

Single Element Models



Twin Element Models



Product Changes

Diameter and Height Changes

In April 2003 the jacket diameter on all 80 -160L models was reduced from 492mm to 478mm.

In January 2004 the overall height of single and twin element 400L models was reduced by 40mm. As part of this change the inlet fitting was raised 40mm to maximise delivery and the height of the booster element was dropped 40mm to retain the same boost volume.

In May 2004 the 661050 (LH connections) and 671050 (RH connections) models were replaced with the 691050 dual handed model. The dimensions remained unchanged.

In October 2005 the 691050 was superseded by the 691G50 to meet new MEPS requirements. As part of this change the diameter increased from 393mm to 437mm and the height increased from 670mm to 673mm

In March 2006 the 691G50 (dual handed) models were superseded by the 661050F (LH connections) and 671050F (RH connections). The F series 50 litres have a double plus cylinder allowing for a reduction in diameter from 437mm to 393mm making the unit more suitable for in cupboard installation. The overall height however increases from 673mm to 690mm.

Element Changes

In November 2005 a new design electric element and cylinder element barrel was introduced to all Vulcan electric storage water heaters (refer to fig. 1A & 1B).

The new design elements utilise a new flange, gasket and earthing arrangement and are a direct replacement for earlier model elements and as such part numbers remain unchanged.

The new type gaskets (refer to fig.2) will also fit earlier model elements and are now supplied with the element. These new gaskets have a radius on the top internal edge allowing a better seal against the element, are shorter overall by 2mm, and have a flange thickness of 2.15mm instead of 2.25mm.

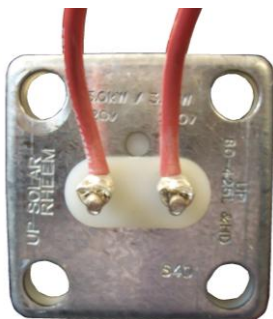


Fig.1A
New design element front view



Fig.1B
New design element side view



Fig.2
New design element gasket

The new design cylinder element barrels do not have an earthing tab and require the earth bond to be connected to the earthing tab on the thermostat clamp (refer to fig. 4).



When installing an early or new type element on a cylinder barrel that has an earth tab, this earth tab must be used (refer to fig.3).



When installing an early or new type element on a new type cylinder barrel that does not have an earth tab, the earth tab on the thermostat clamp must be used (refer to 4).



Fig.3.
Cylinder barrel Earth tab



Fig.4.
Thermostat clamp Earth tab

Refer also to Technical Bulletins TB05 019 and TB05 020

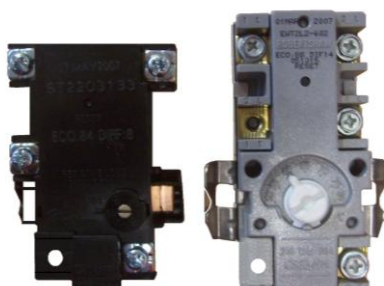
Thermostat changes

From August 14 2007, the Robertshaw EWT series thermostats have been replaced by the Robertshaw ST series thermostats. This change applies to all electric water heaters.

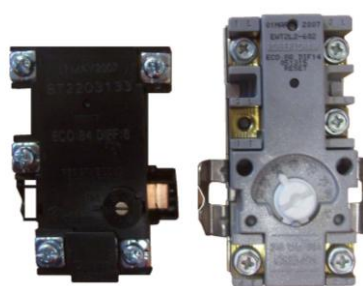
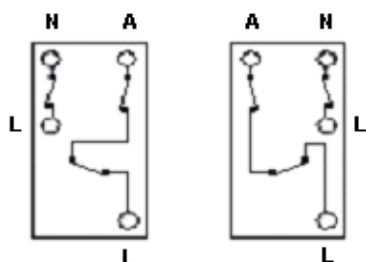
It should be noted that although ST series thermostat is a direct replacement for the EWT series thermostat, the terminal connections and wiring arrangement is different. Therefore;



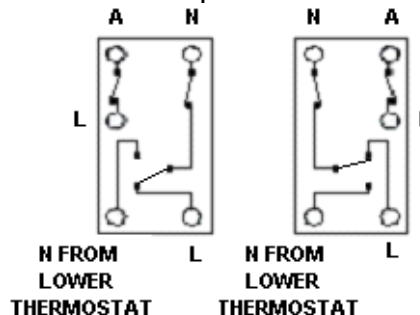
Whenever an EWT series thermostat is replaced with a ST series thermostat as a spare part, each water heater will require rewiring at the thermostat. Refer to wiring diagrams in this service instruction for wiring arrangements utilising the new ST series thermostat.



ST12 Replaces EWT1



ST22 Replaces EWT2



Common Faults

When a complaint is lodged about the performance of a hot water system there are a number of causes that should be checked and eliminated. In an attempt to pinpoint the most likely cause it is important to discuss with the customer their reasons for the complaint, the duration of the problem, any change in circumstances or usage and recent weather conditions. This information in conjunction with the following listed common complaints will assist you in locating the most likely cause. All procedures assume there is water flowing through the water heater.

Excessive hot water usage

The complaints of insufficient hot water and no hot water can on many occasions be attributed to hot water usage exceeding the capacity of the water heater to provide hot water.

When first attending a call of this nature it is essential to establish the probable hot water usage by querying the usage habits of the household and compare this with the potential delivery of the model water heater installed. It can then be established if the usage is within or outside the capacity of the model. The areas to look at for excessive usage are:

1. Automatic washing machines.
2. Showers exceeding 12 litres/minute for mixed water and 5 minutes in duration.
3. Two or more showers operating at the same time.
4. Change of occupancy or number of persons increased.
5. High water pressure area (Excessive pressure relief valve discharge).
6. Plumbing leaks.
7. Thermostat temperature setting.
8. Crossed connection.

Discoloured water

This may be the result of discoloured water entering from the cold water mains. Check if the cold water is also discoloured.

Water hammer

A water heater will not cause water hammer, however valves associated with the water heater may be the source of the problem i.e. cold-water stopcock, non-return valve or relief valve.

Most water hammer problems are associated with plumbing, hot and cold or appliances i.e. solenoid valves, ballcocks, loose pipes, sharp angles in pipe work, faulty or worn valve parts, loose tap washers or neighbouring equipment.

High water pressure areas will have more complaints of this nature and the use of a pressure-limiting valve (PLV) to reduce the household cold-water pressure will usually solve most problems.

Hot water plumbing leaks

If hot water has not been used for a period of time, feeling the temperature of the hot water line may give an indication of water flow if the pipe is warm. The method of checking for plumbing leaks is:

1. Turn off the stopcock on the cold water supply to the water heater.
2. Open a hot tap to ensure the flow of water stops. This will confirm the stopcock is operating correctly.
3. Turn off the hot tap.
4. Turn on the stopcock to make up the water pressure in the cylinder and then turn the stopcock off again.
5. Wait approximately 5 minutes then do either of the following:
 - a. With your ear close to the stopcock turn it on slightly and listen for any water passing. If there are no leaks, water should not pass.
 - b. Open a hot tap while listening for any pressure release. If there is a pressure release there will be no leaks in the plumbing system.

Mixing or crossed connections

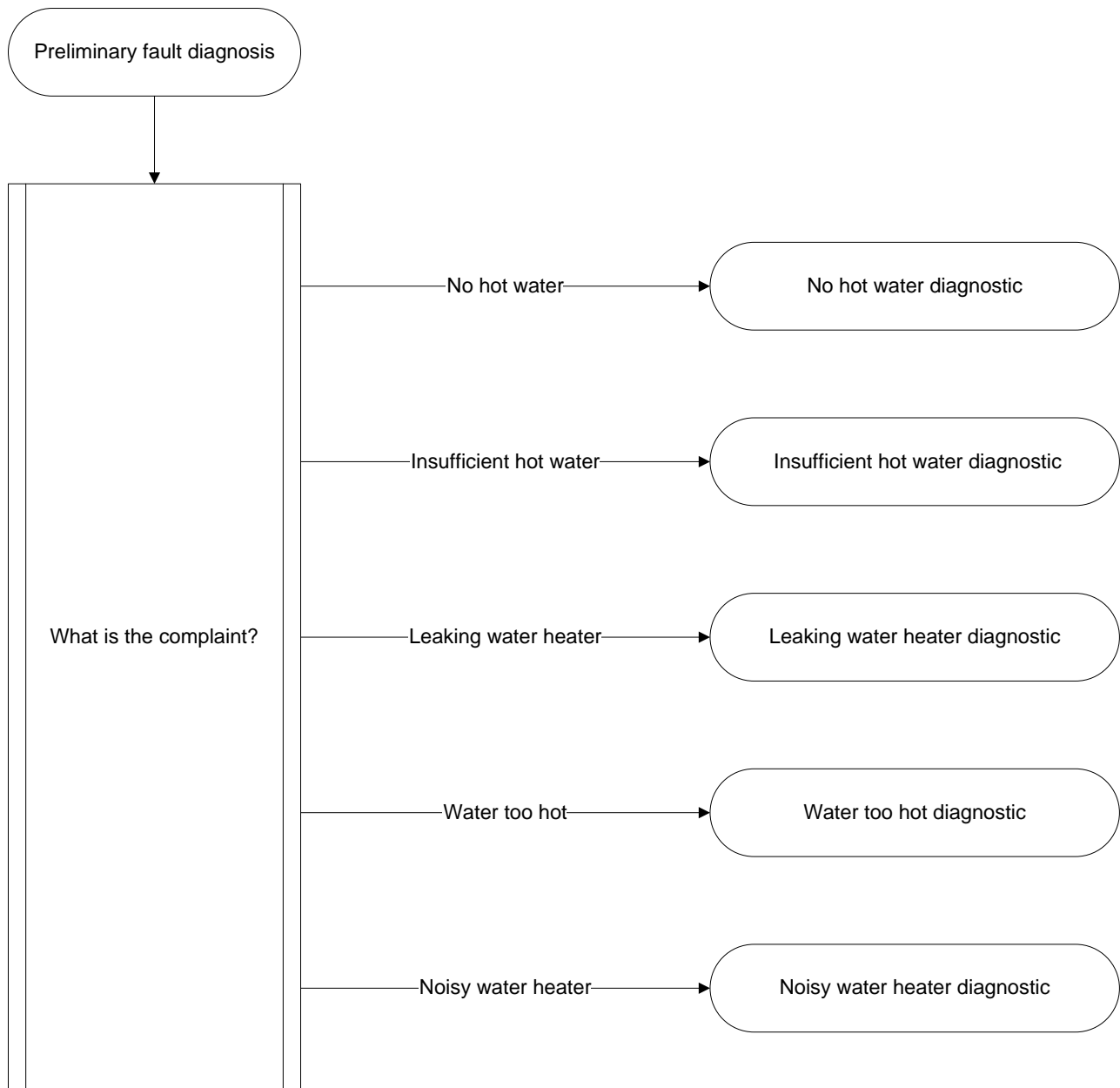
If an automatic dishwasher, washing machine, flick mixer tap, tempering valve or thermostatic mixing valve is installed there is always the possibility that the cold water could mix with the hot water through a faulty or incorrectly installed valve. This is referred to as a cross connection. The complaints of insufficient hot water, water too cold or excessive discharge from the pressure relief valve may be attributed to a cross connection. The method of checking for a cross connection is:

1. Turn off the stopcock on the cold water supply to the water heater.
2. Open a hot tap. If water flow is persistent and cold then a cross connection exists.

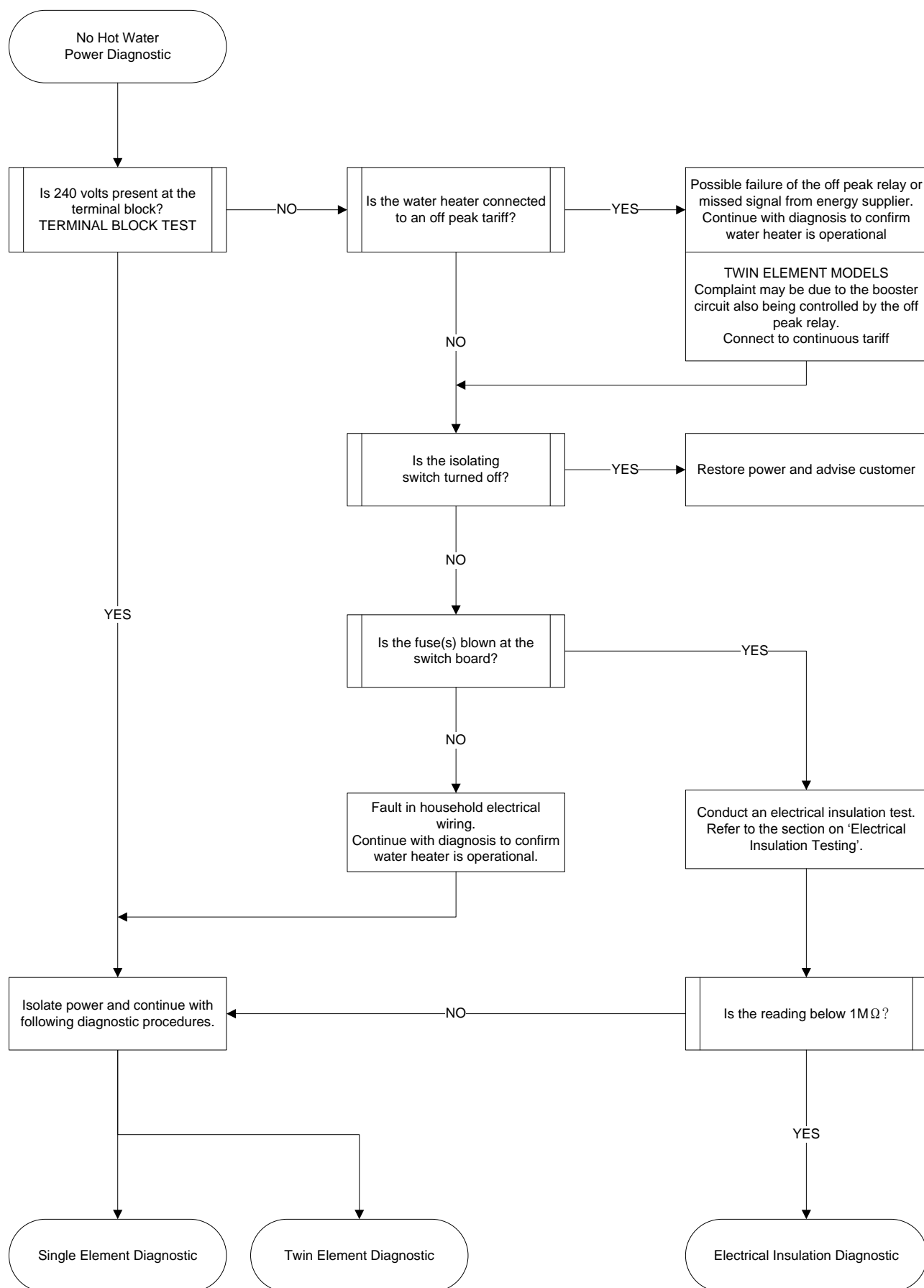
Fault Finding Chart Index

Fault	Chart Name	Page
No hot water	Power Diagnostic	14
	Single Element Diagnostic	15
	Twin Element Diagnostic	16
Insufficient hot water	Insufficient Hot Water Diagnostic	18
Leaking water heater	Leaking Water Heater Diagnostic	20
Water too hot	Water Too Hot Diagnostic	21
Noisy water heater	Noisy Water Heater Diagnostic	22
Blown fuse/circuit breaker	Electrical Insulation Test	23

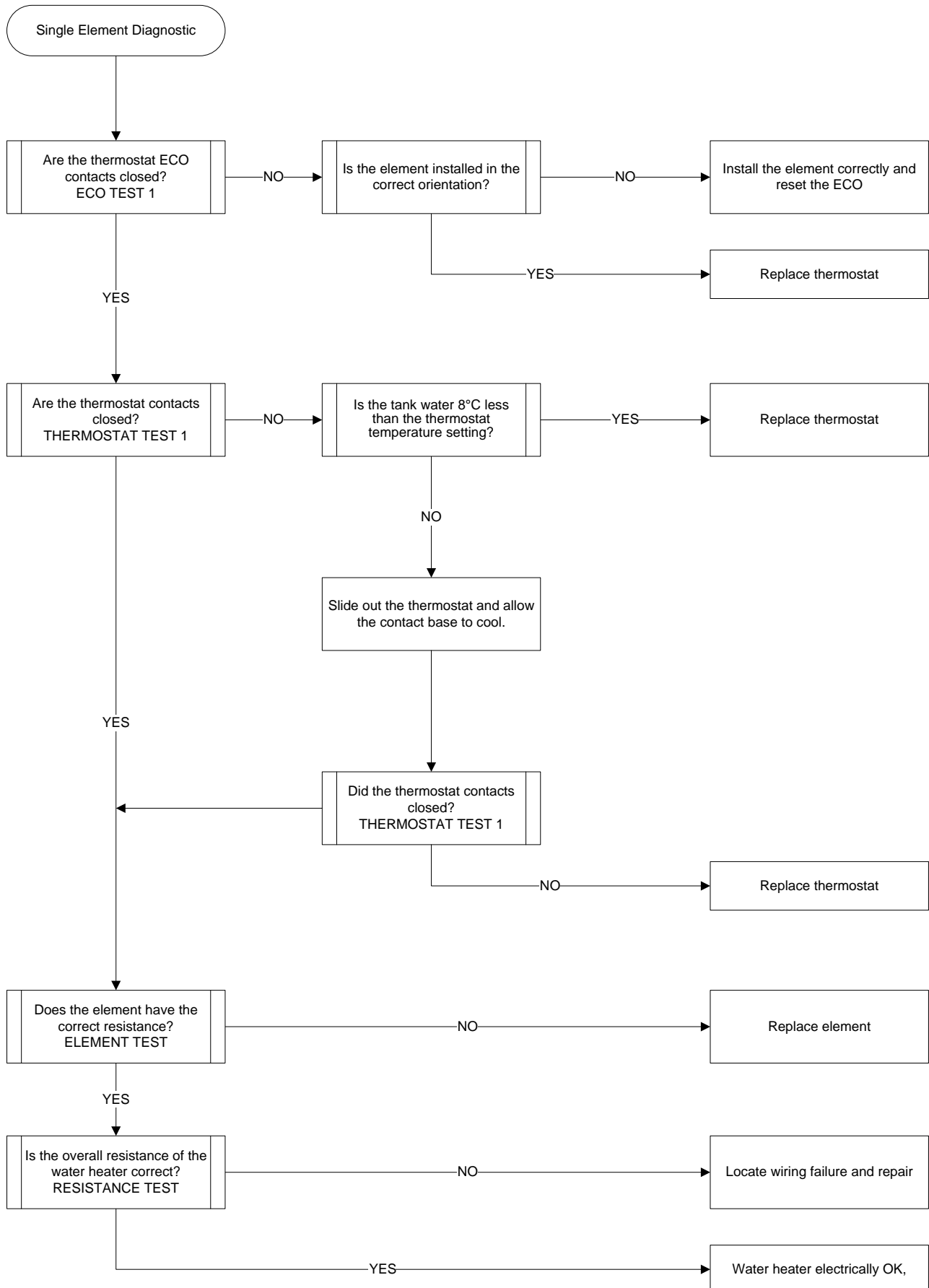
General Fault Finding Chart



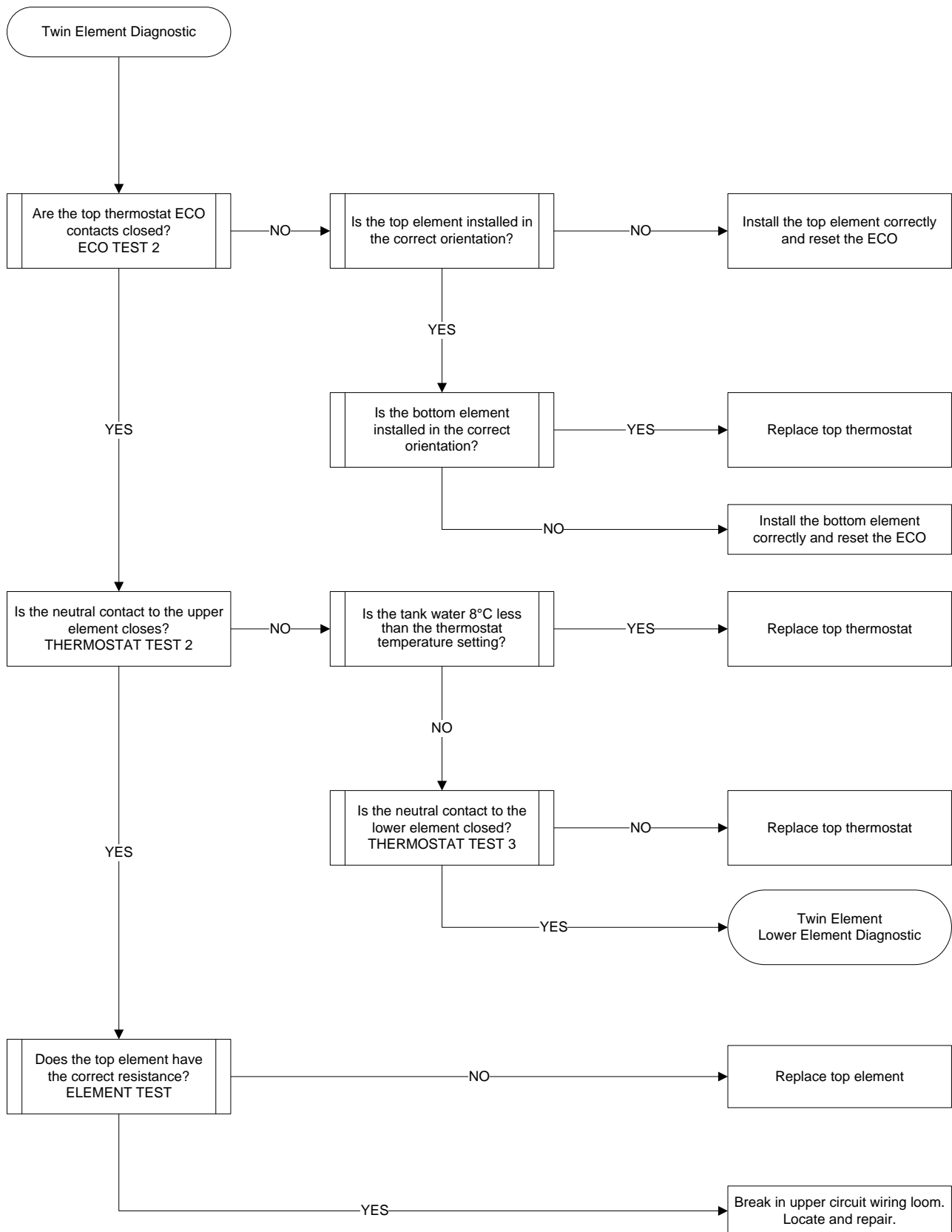
Power Supply



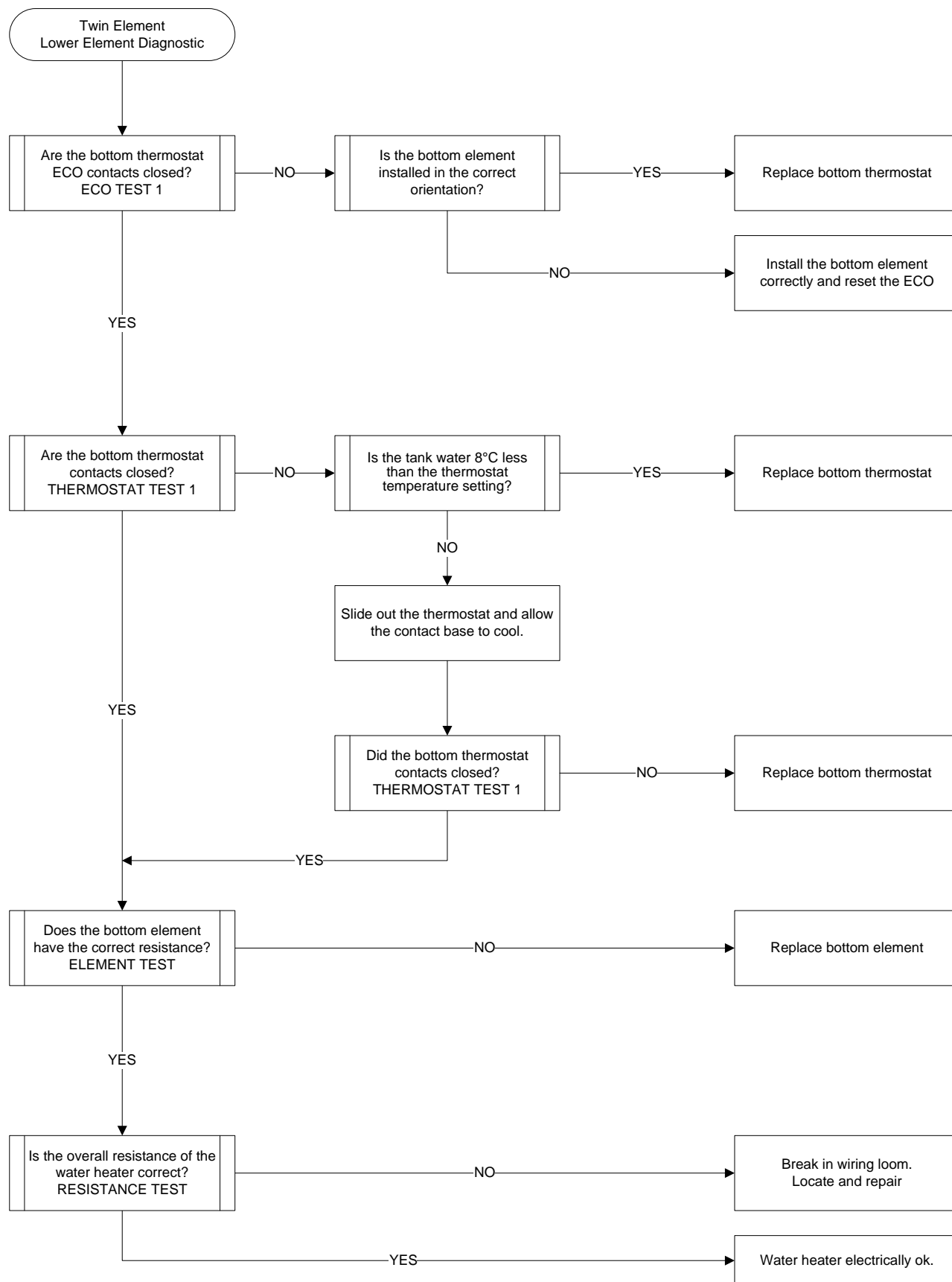
Single Element



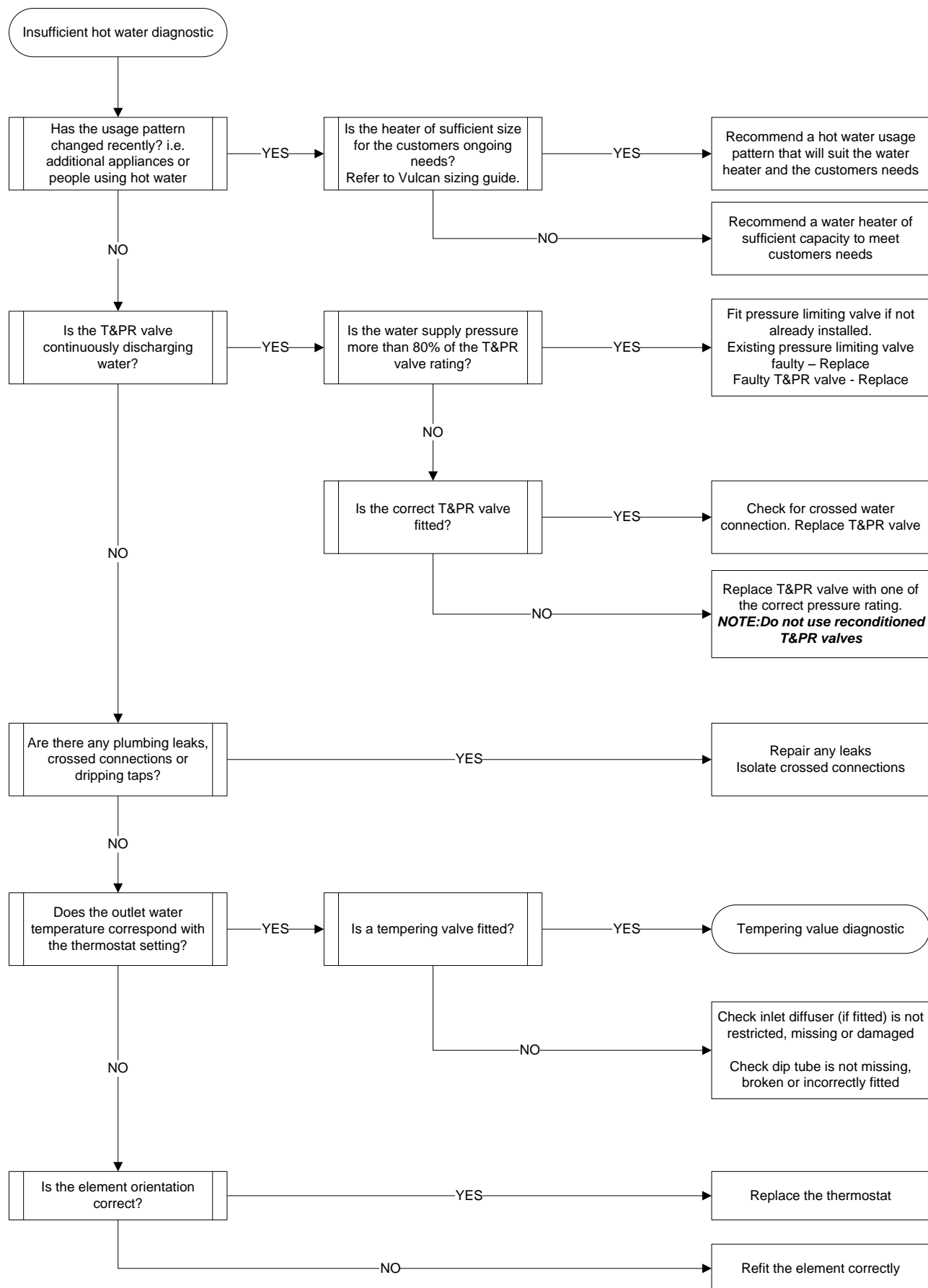
Twin Element – Upper Element



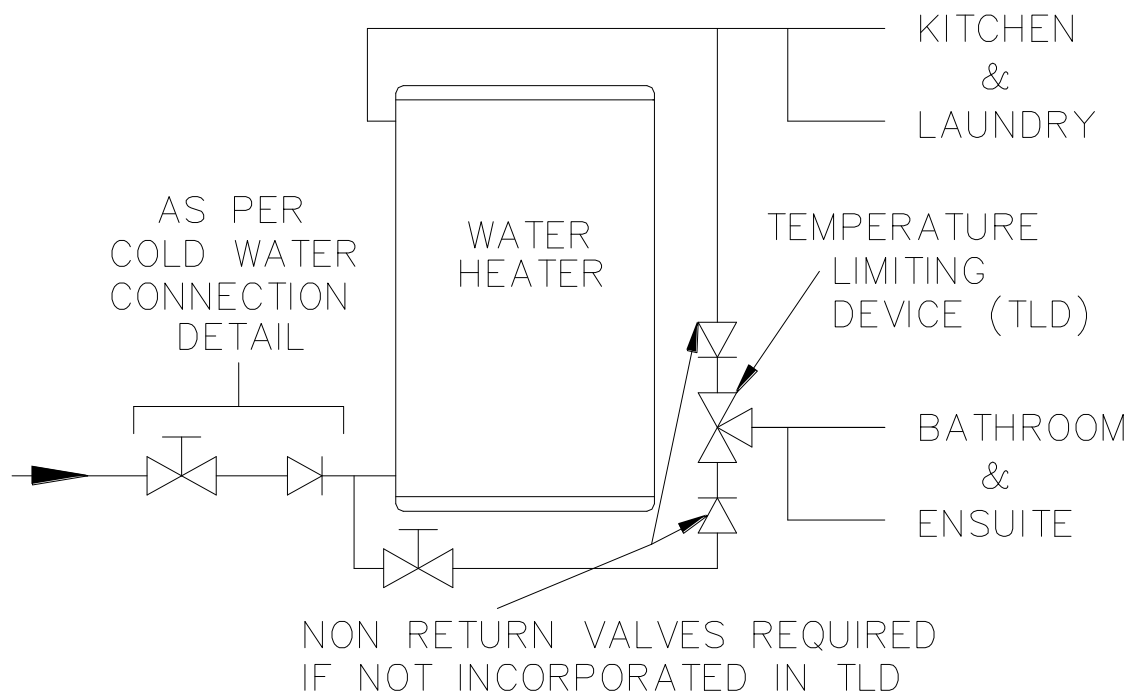
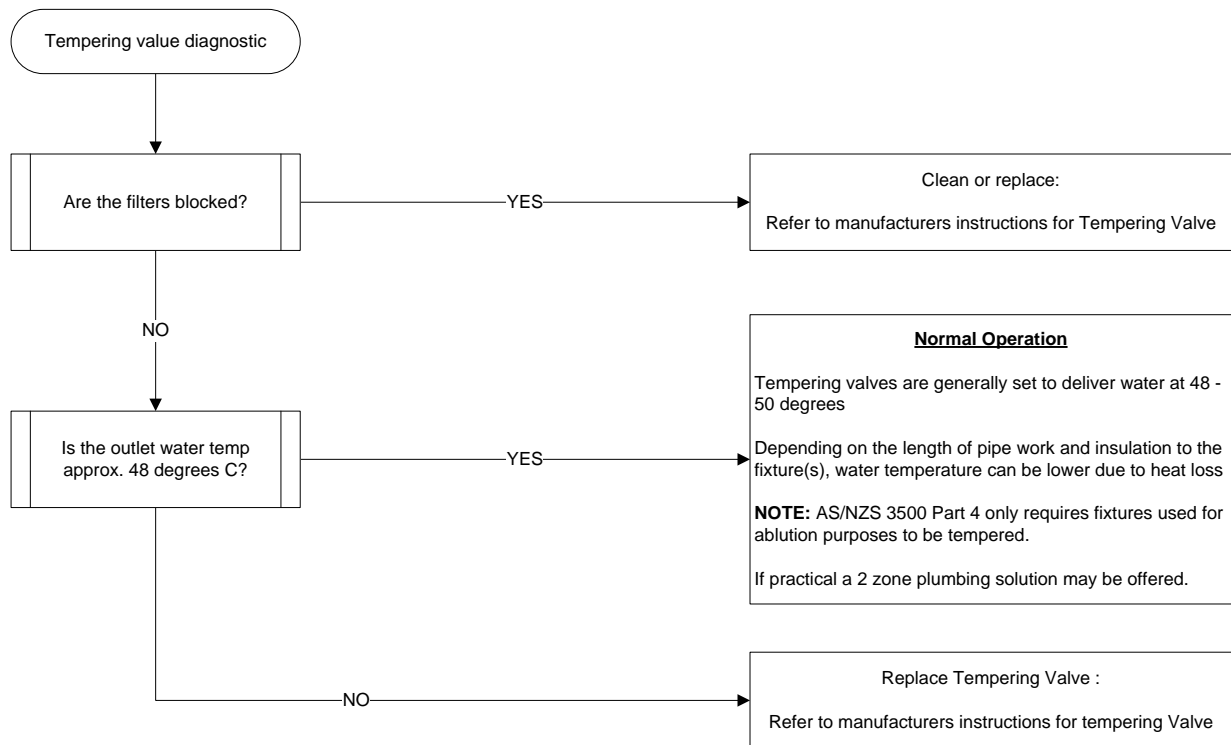
Twin Element – Lower Element



Insufficient Hot Water

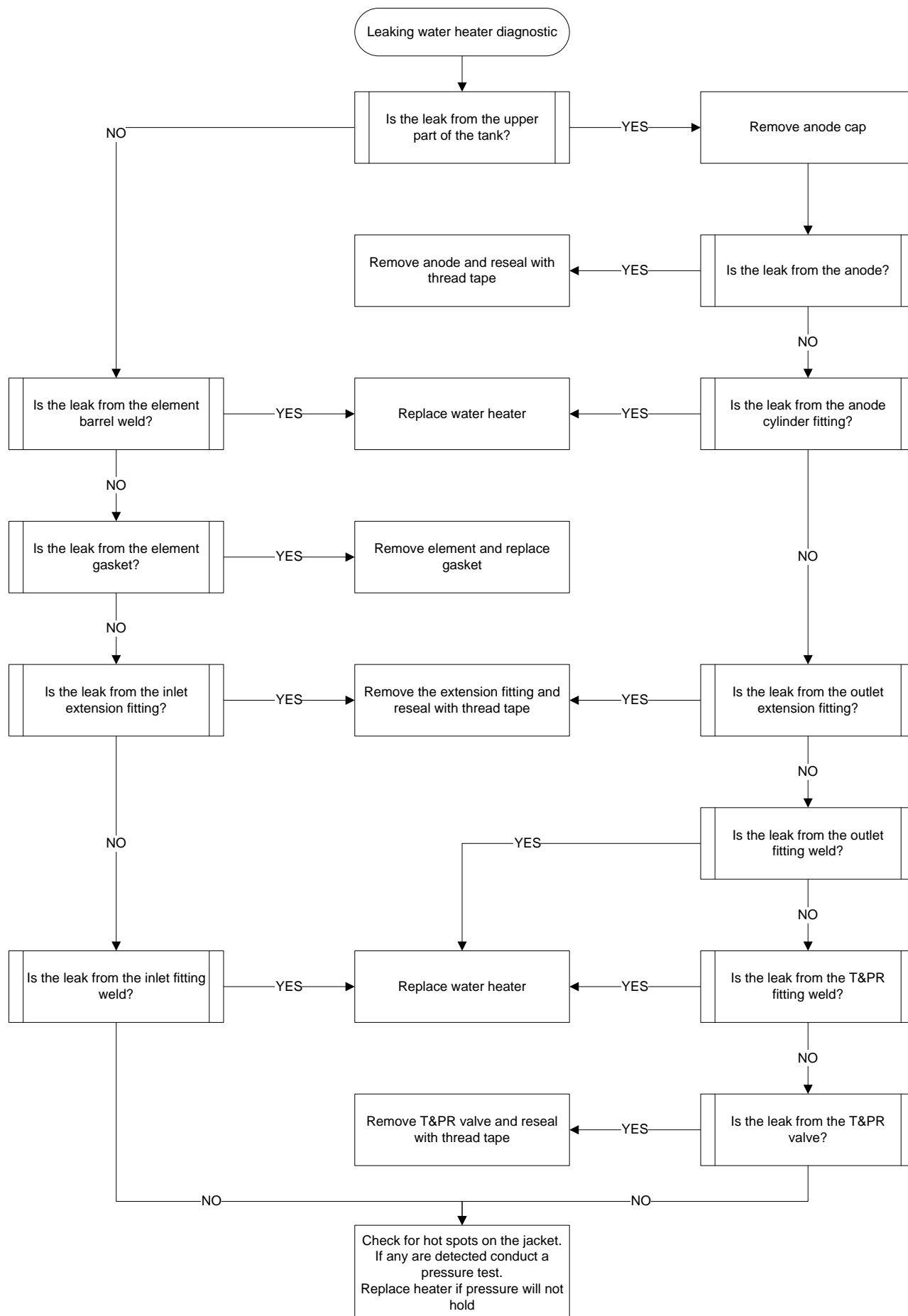


Tempering Valve Diagnostic

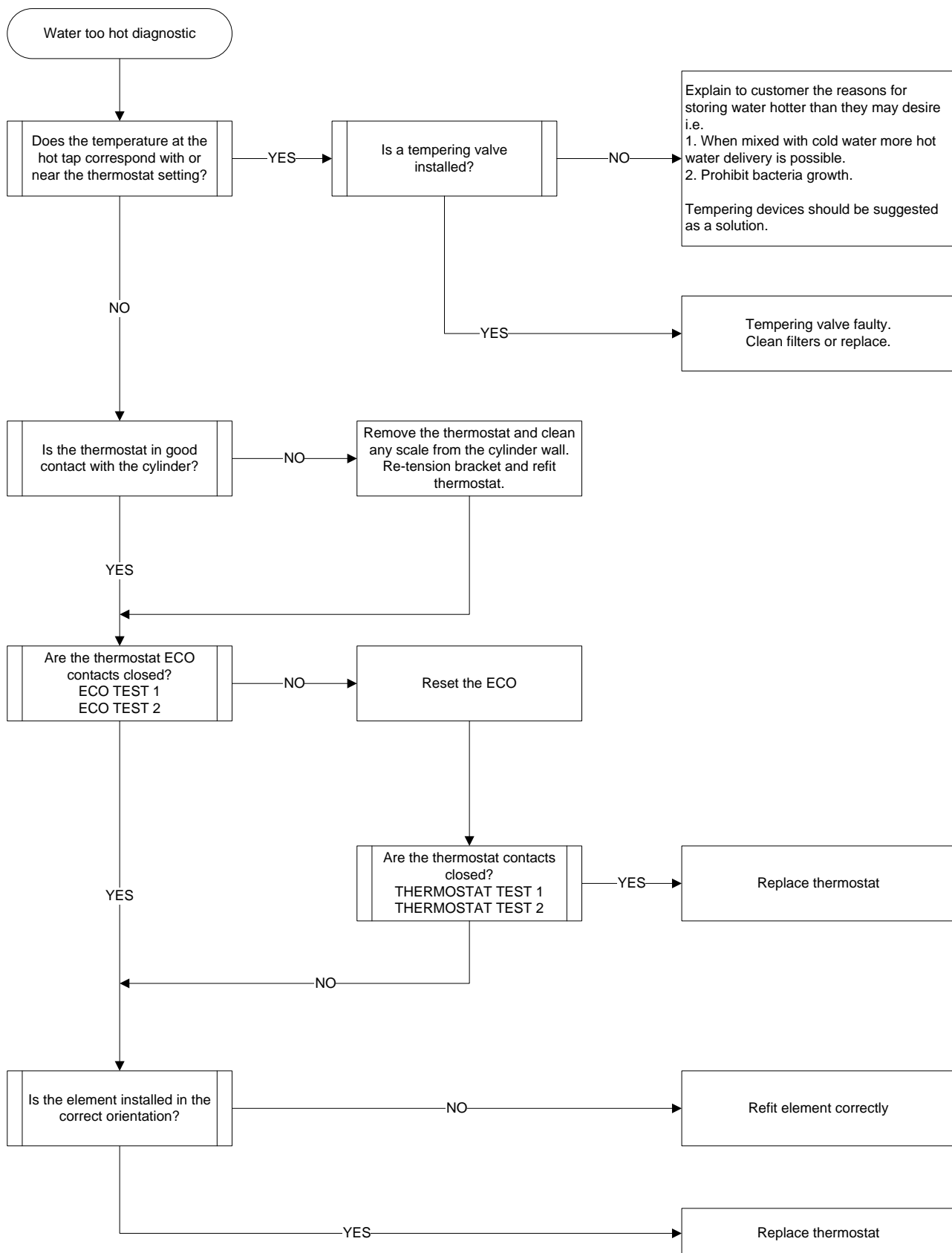


2 zone plumbing solution

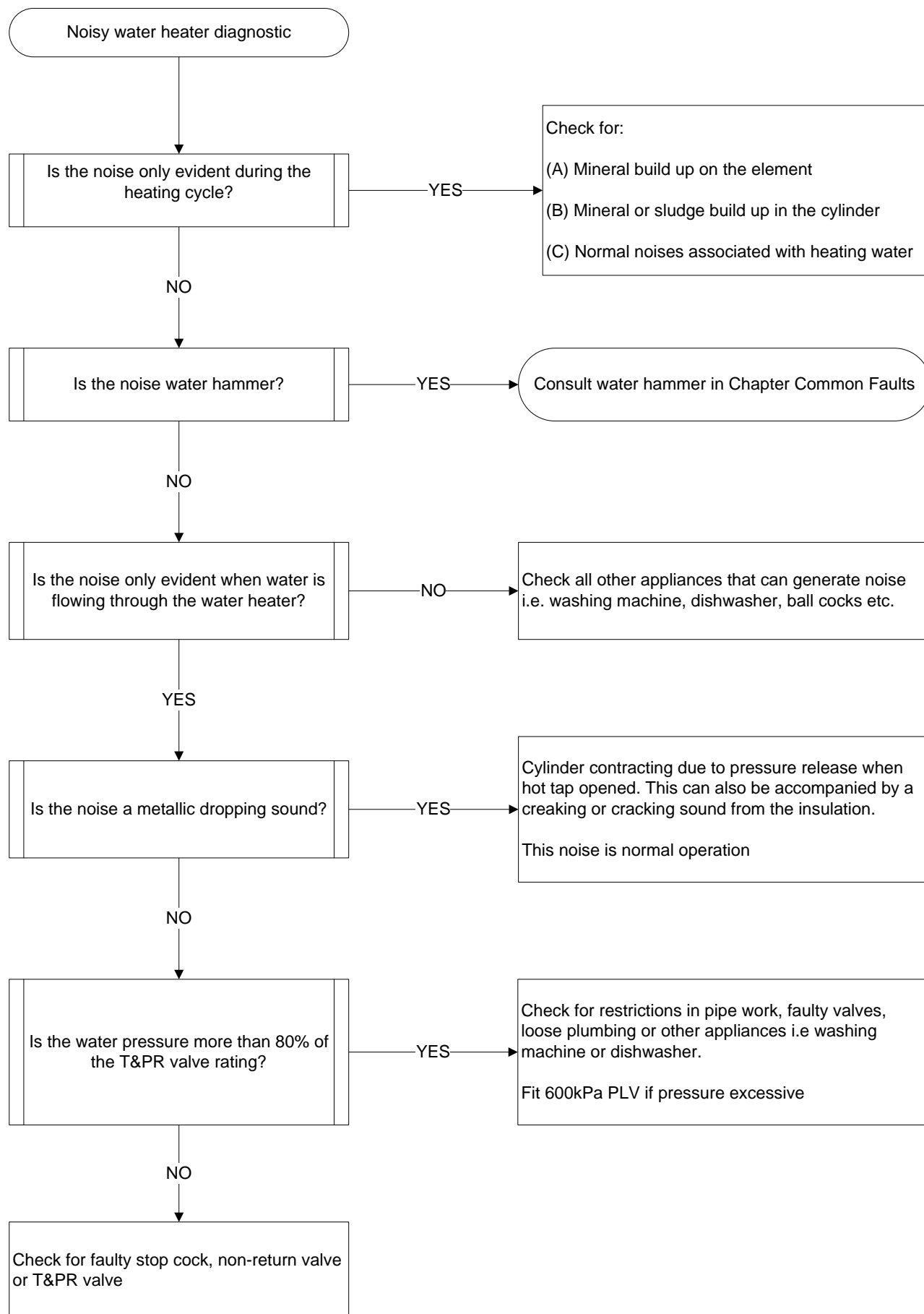
Leaking Water Heater



Water Too Hot



Noisy Water Heater



Electrical Insulation Testing

There are three basic test procedures that should be carried out when the operation and function of a water heater's electrical system is in doubt.



Personal Protective Equipment should be worn when conducting step 1 of this procedure to reduce the risk of electric shock. Refer to Rheem safety procedure on electrical testing

To check insulation resistance of the water heater Neutral Circuit (reading not to be below 1 mega-ohm).

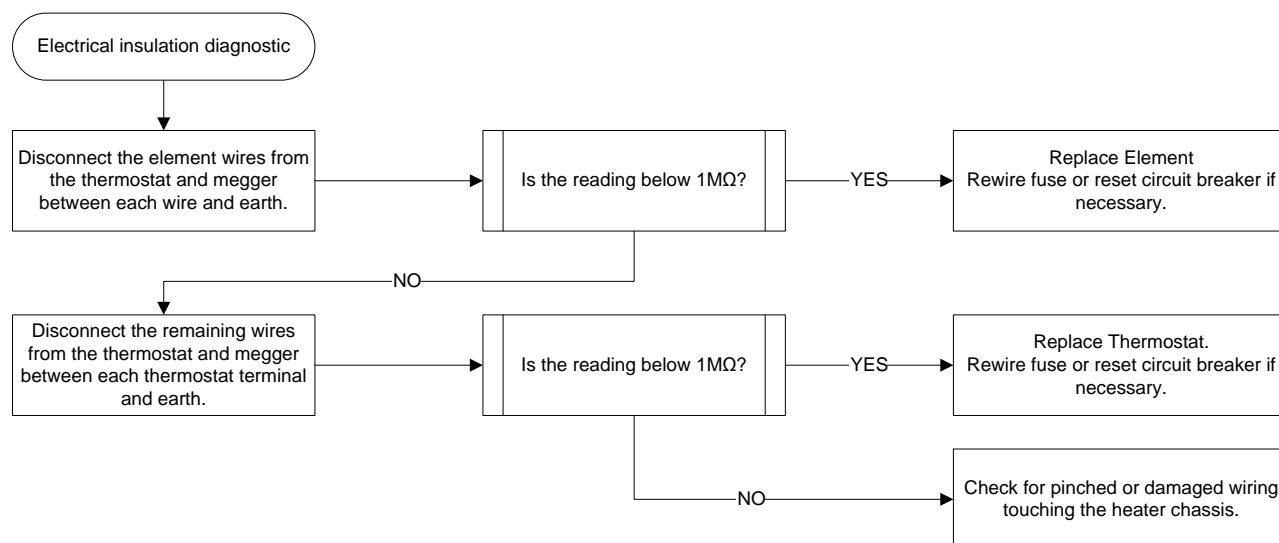
1. **Isolate power to the water heater by removing fuse. Confirm with multi-meter across Active and Neutral at the terminal block that voltage is not present.**
2. Once satisfied, disconnect the active and neutral wires from the terminal block.
3. Connect megger leads to the neutral of the water heater wiring and earth.
4. Operate megger. A reading above 1 mega-ohm should be obtained.
5. If a reading below 1 mega-ohm is indicated, all component parts will need to be individually tested to locate the fault. Refer to flow diagram 7 above.

To check insulation resistance of the water heater Active Circuit (reading not to be below 1 mega-ohm).

6. Connect megger leads to the active of the water heater wiring and earth.
7. Operate megger. A reading above 1 mega-ohm should be obtained.
8. If a reading below 1 mega-ohm is indicated, all component parts will need to be individually tested to locate the fault. Refer to flow diagram 7.

To check "Continuity" of water heater electrical circuit.

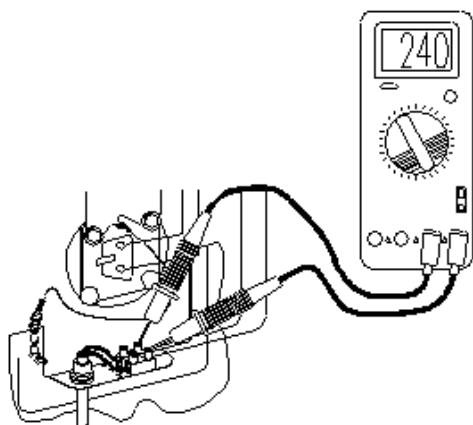
9. Set megger to resistance scale or multimeter to x1 resistance scale.
10. If a reading greater than 50 ohms is indicated, all electrical component parts will need to be individually tested to locate the fault. Refer to test 8, page 26 for indicative resistances.
11. Reconnect active cable to 'A' terminal and neutral cable to 'N' terminal at heater terminal block.
12. Replace fuse. **Note: If continuing with diagnosis procedures do not replace fuse.**



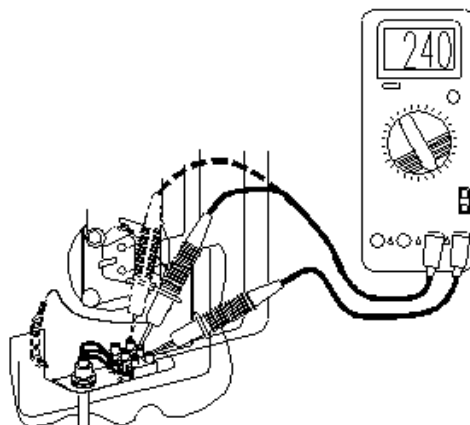
Component Tests

Terminal Block Test

Single Element



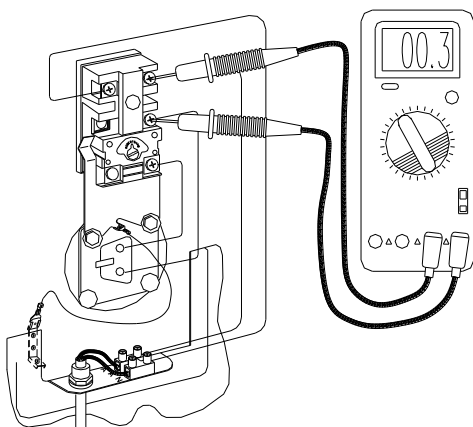
Twin Element



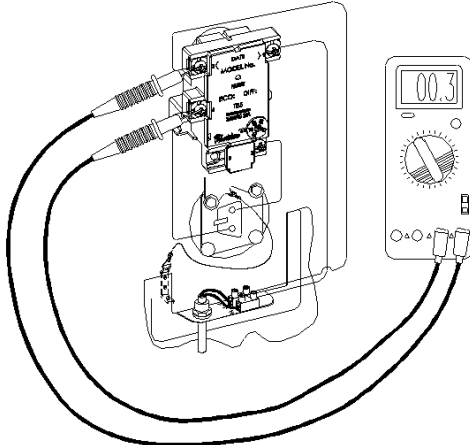
Using a multimeter on the AC voltage scale, measure between each active and neutral on the terminal block. Normal voltage is 240 volts

ECO Test 1

EWT1 Thermostat



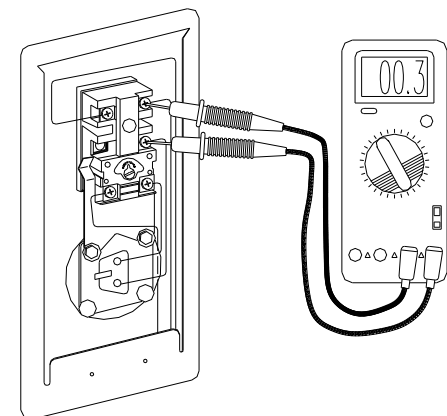
ST12 Thermostat



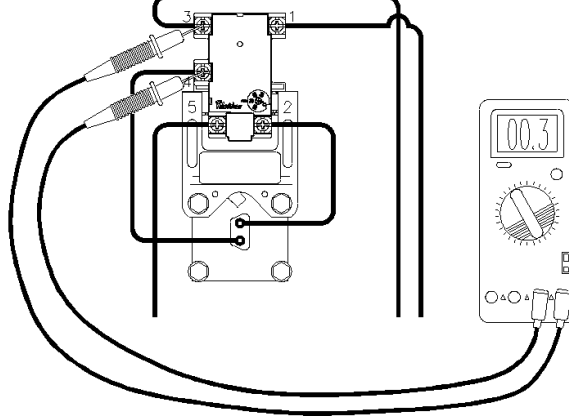
Using a multimeter on the x1 resistance scale, measure between terminals indicated above on the thermostat. The reading should be less than 1 ohm.

ECO Test 2

EWT2 Thermostat



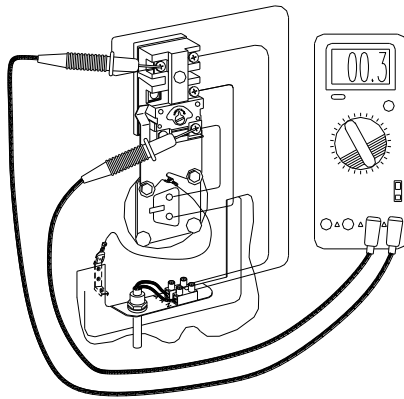
ST22 Thermostat



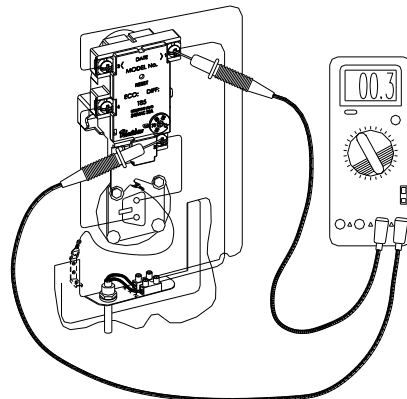
Using a multimeter set on the resistance scale, measure between the terminals indicated above on the top thermostat. The reading should be less than 1 ohm.

Thermostat Test 1

EWT2 Thermostat



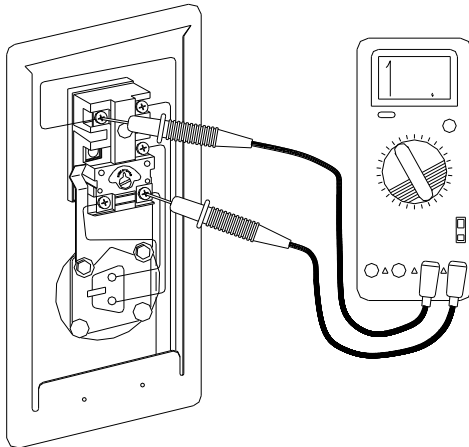
ST22 Thermostat



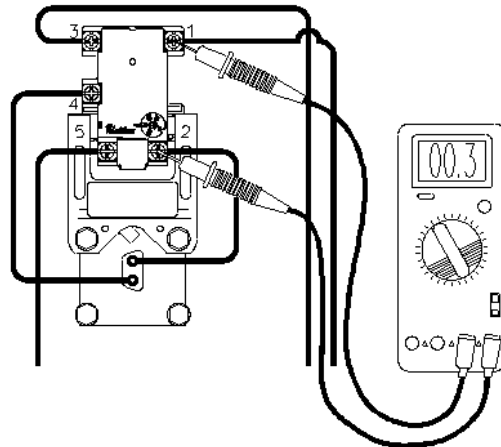
Using a multimeter on the resistance scale, measure between the terminals indicated above on the thermostat. The reading should be less than 1 ohm.

Thermostat Test 2

EWT2 Thermostat



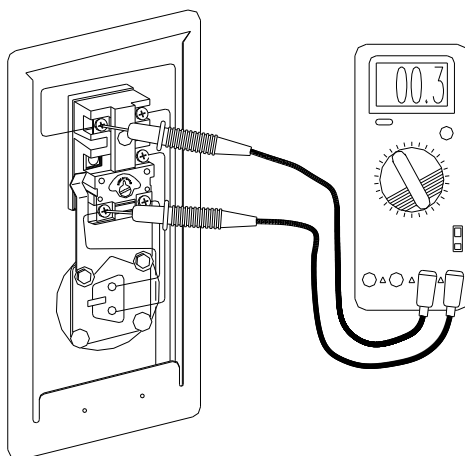
ST22 Thermostat



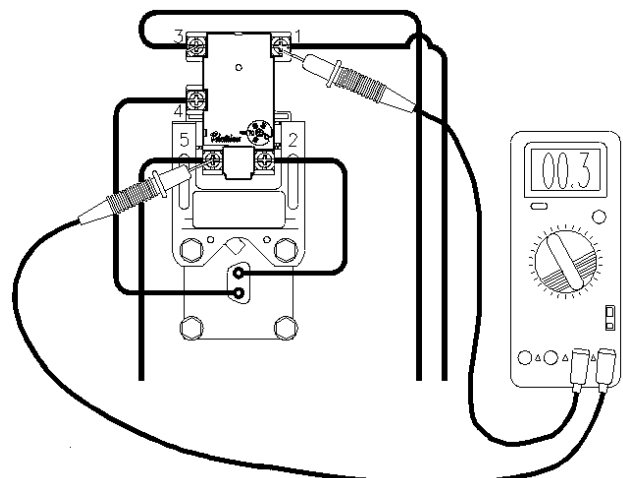
Using a multimeter set on the resistance scale, measure between the terminals indicated above on the upper thermostat. If the reading is less than 1 ohm the neutral to the top element is closed.

Thermostat Test 3

EWT2 Thermostat



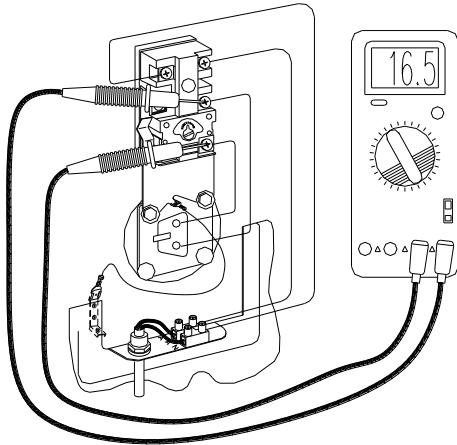
ST22 Thermostat



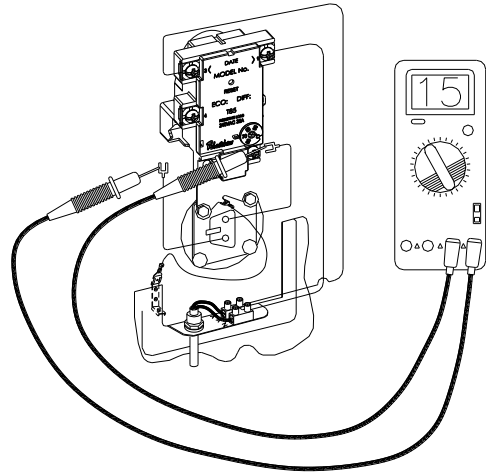
Using a multimeter set on the resistance scale, measure between the terminals indicated above on the upper thermostat. If the reading is less than 1 ohm the neutral to the bottom element is closed.

Element Test

EWT Thermostat



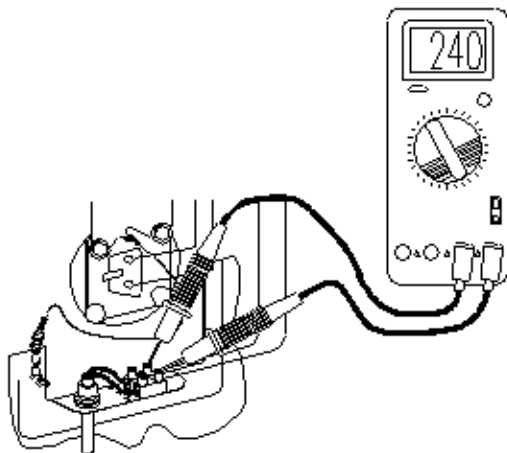
ST Thermostat



Using a multimeter set on the resistance scale, measure across the element wires. Normal resistance for the heating unit is:

1.2kW: 43-53Ω; 1.5kW: 35-42Ω; 1.8kW: 29-35Ω; 2.4kW: 22-26Ω; 3.0kW: 17-21Ω; 3.6kW: 15-17Ω; 4.8kW: 11-13Ω; 6.0kW: 9-11Ω.

Resistance Test



Using a multimeter set on the x1 resistance scale, measure between active and neutral on the terminal block.

Normal resistance when the thermostat contacts are closed is:

1.2kW: 43-53Ω; 1.5kW: 35-42Ω;
1.8kW: 29-35Ω; 2.4kW: 22-26Ω;
3.0kW: 17-21Ω; 3.6kW: 15-17Ω;
4.8kW: 11-13Ω; 6.0kW: 9-11Ω.

Component Replacement

Draining the Water Heater



Elevated temperatures may be present during the draining process. Personal Protective Equipment should be worn to prevent the risk of scalding.



Personal Protective Equipment should be worn when conducting step 2 of this procedure to reduce the risk of electric shock. Refer to Rheem Safety Procedure on electrical testing.

1. ***Isolate the power and water supplies to the water heater*** and remove lower access cover.
2. ***Relieve pressure from the water heater through T&PR valve or a hot tap.***
3. ***Confirm with a multi-meter between each Active and Neutral at the terminal block that voltage is not present.***
4. Disconnect the cold water supply pipe.
5. Fit a drain hose to the cold water connection and run the other end to a drain or safe location.
6. Open the temperature and pressure relief valve to allow air into the system.

Temperature & Pressure Relief Valve



Never fit a T&PR valve with a rating higher than that indicated on the water heater rating plate. Do not use reconditioned T&PR valves.

1. Partially drain the water heater. Refer to 'Draining the Water Heater' procedure above.
2. Remove the drain line from the T&PR valve.
3. Unscrew the T&PR valve and remove.
4. Confirm the replacement T&PR valve is the correct rating and refit using thread tape.
5. Refit the drain line.
6. Close the hot tap and restore water supply.
7. Check T&PR valve thread for leaks.
8. Operate the T&PR valve lever to reset relief drain.
9. Purge air from the system through hot taps.
10. Restore the power supply to the water heater.

Dip Tube

1. Partially drain the water heater. Refer to 'Draining the Water Heater' procedure on page 27.
2. Disconnect the hot water line from the outlet of the water heater.
3. Remove the extension fitting.
4. Using a flat blade screwdriver gently split the outer rim at the top and bottom of the dip tube face and prise the dip tube out of the cylinder fitting.
5. Fit the replacement dip tube into the cylinder fitting ensuring the flat lines up with the fitting (dip tube facing up) and gently drive the dip tube into the fitting a short distance.
6. Apply thread tape to the extension fitting and refit; this will push the dip tube into the correct location.
7. Reconnect the plumbing and restore the water supply.
8. Purge air from the system through hot taps.
9. Restore the power supply.

Anode



Elevated temperatures may be present during the draining process. Personal Protective Equipment should be worn to prevent the risk of scalding.

1. ***Isolate the power and water supplies to the water heater.***
2. ***Relieve pressure from the water heater through the T&PR valve or a hot tap.***
3. Remove the anode cap.
4. Using a 27mm tube or socket spanner remove the anode.
5. Apply thread seal tape to replacement anode, refit and tighten. **Note:** It may be necessary to cut the anode to length prior to fitting. Refer to specifications on page 5 for the correct anode length.
6. Restore water supply and check for leaks.
7. Refit the anode cap.
8. Purge air from the system through hot taps and restore the power supply to the water heater.

Top Thermostat - Non-Simultaneous



Personal Protective Equipment should be worn when conducting step 2 of this procedure to reduce the risk of electric shock. Refer to Rheem Safety Procedure on electrical testing.

1. ***Isolate electrical supply*** and remove upper and lower front covers.
2. ***Confirm with multi-meter between each Active and Neutral at the terminal block that voltage is not present.***
3. Remove the protective cover and disconnect wiring from the thermostat (Note wiring positions).
4. Slide thermostat vertically out of clamp.
5. Clean any corrosion from cylinder wall.
6. Slide replacement thermostat into place behind clamp and connect wiring to appropriate points. Refer to Wiring Diagram on page 8.
7. Check water heater internal wiring insulation for cracking.
8. Refit the thermostat protective cover and upper access cover securely.
9. Conduct an electrical insulation test. Refer to page 23.
10. Replace lower access cover and restore electrical supply.

Bottom Thermostat – Trade Adjustable



Personal Protective Equipment should be worn when conducting step 2 of this procedure to reduce the risk of electric shock. Refer to Rheem Safety Procedure on electrical testing.

1. ***Isolate the power to the water heater*** and remove access cover.
2. ***Confirm with multi-meter between each Active and Neutral at the terminal block that voltage is not present.***
3. Remove the thermostat protective cover and disconnect the wiring from the thermostat.
4. Slide the thermostat out from under the retaining clamp. Note the current temperature selected.
5. Remove any scale from the cylinder surface.
6. Slide the replacement thermostat under the clamp and set temperature to that noted in step 4. Reconnect the wiring as per the wiring diagram on page 8.
7. Check water heater internal wiring insulation for cracking.
8. Conduct an electrical insulation test. Refer to page 23.
9. Refit the thermostat protective cover and the lower access cover.
10. Restore the power supply.

Element – Top and Bottom



Elevated temperatures may be present during element removal process. Personal Protective Equipment should be worn to prevent the risk of scalding.



When replacing an element on a heater with a cylinder barrel that does not have an earth tab (refer to page 10) ensure that the metal surround of the element flange is in direct contact with the cylinder barrel flange thus ensuring a good Earthing contact and conduct an earth continuity test as required by AS/NZS 3000 6.3.3.2.

When a fault or leak is traced to the element, the water heater should be drained to prevent damage to flooring or floor coverings by accidental flooding.

1. Drain the water heater. Refer to 'Draining the Water Heater' procedure on page 27.
2. When the water heater is drained, undo the four element screws, removing thermostat clamp first.
3. Withdraw the element. Care must be taken to ensure the loop of the element does not catch in the cylinder opening and open out inside the cylinder.

NOTE: Do not “cut off” the element and leave a portion inside the cylinder

4. Clean around cylinder fitting, fit gasket to new element and slide the element into the cylinder (reverse to step 3) taking care that it is in the correct orientation. See element flange for orientation directions.
5. Replace screws and thermostat clamp and tighten.
6. *Models manufactured after 7/11/05 without an element flange earth tab.*

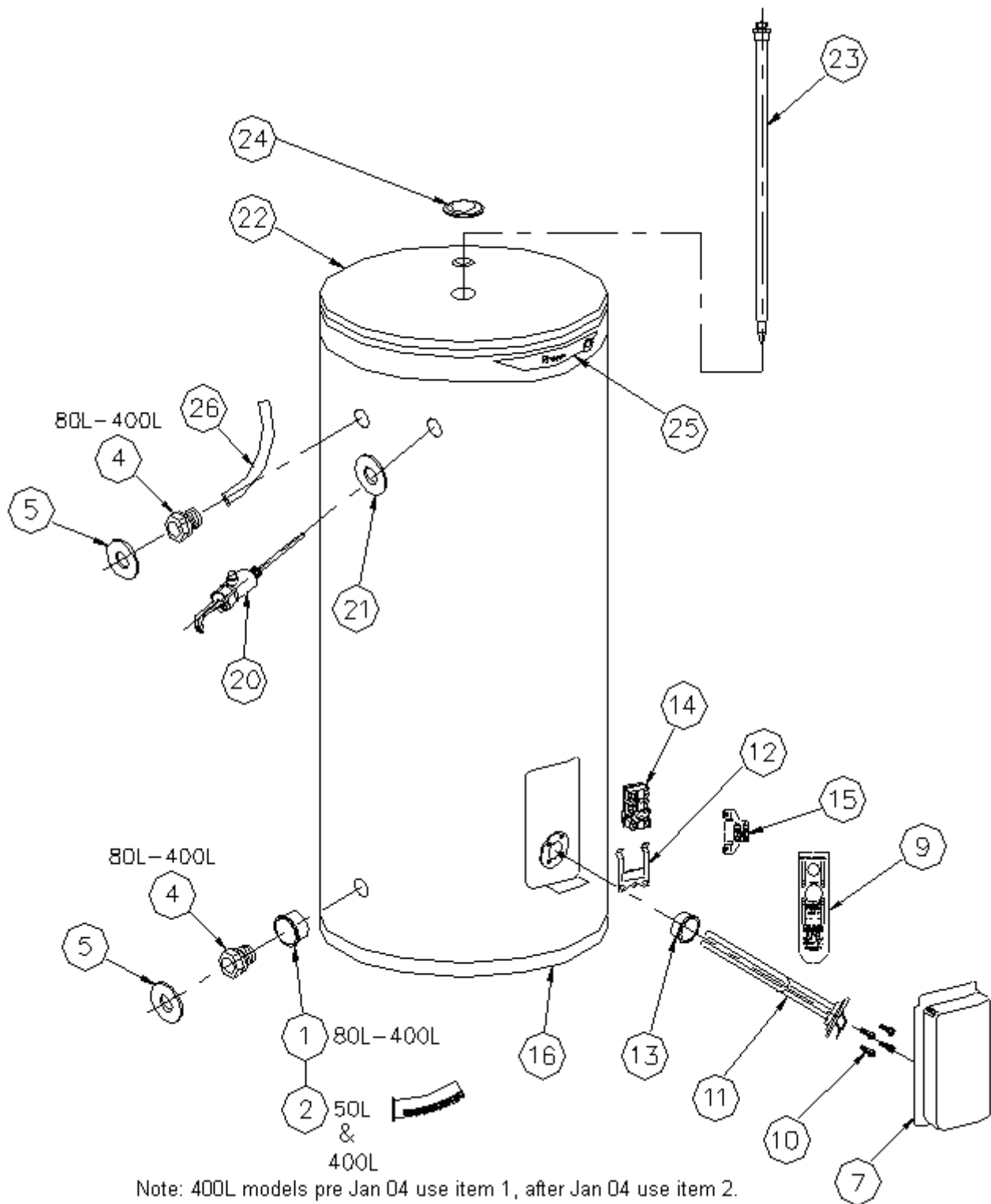
The earthing of the internal storage cylinder relies on a good electrical contact between the metal surround of the element flange and the cylinder barrel flange.

An earth continuity test should be performed whenever an element or element gasket is replaced, adjusted or serviced in any way. This continuity test is performed between the heaters internal storage cylinder and the main earth terminal of the water heater with a resulting reading of not more than 0.5 ohms as required by AS/NZS 3000 6.3.3.2.

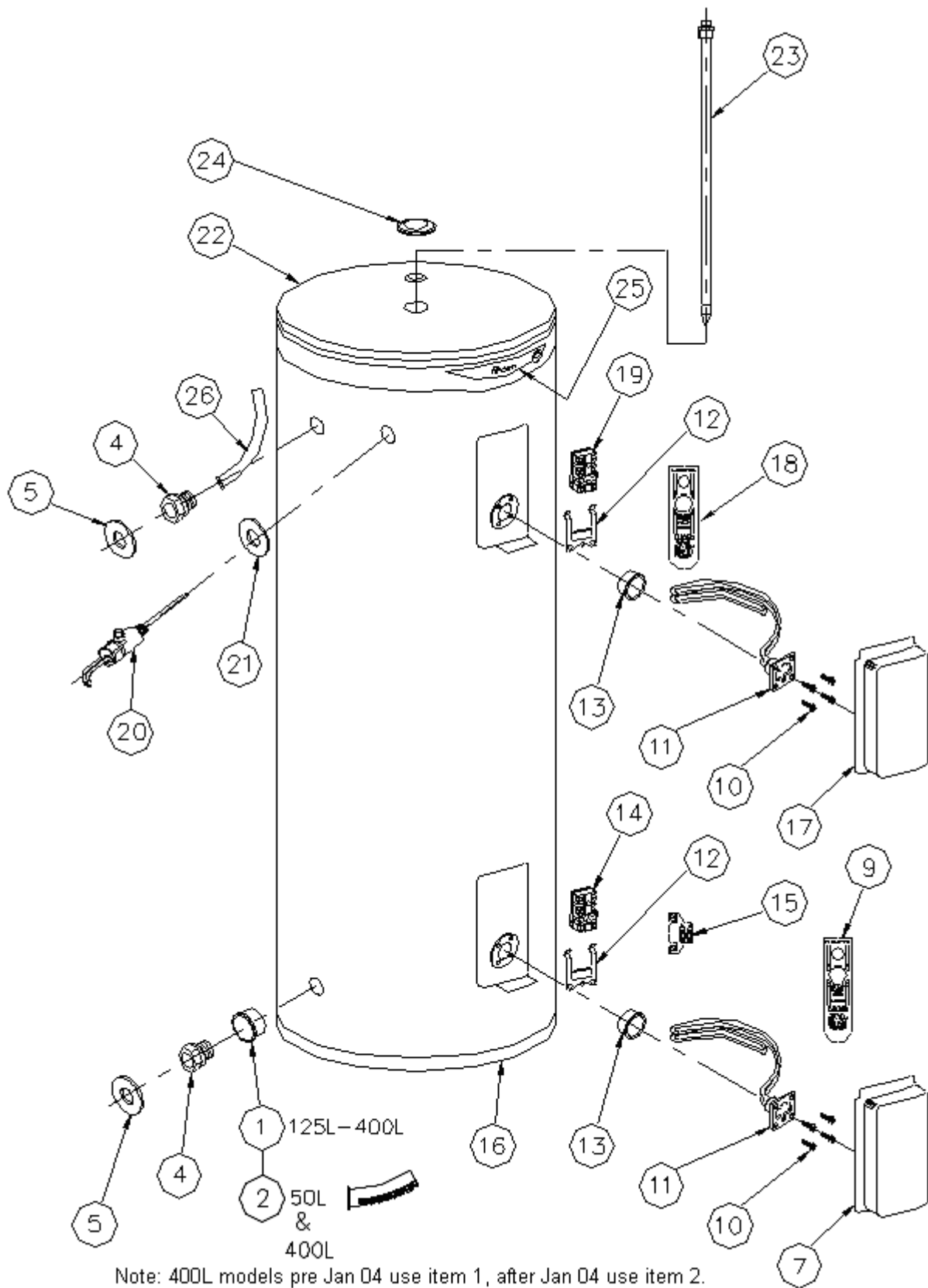


7. Restore cold water supply and fill the storage tank. Release air by gently lifting the easing lever on the T&PR valve until water runs from the drain or opening hot taps.
8. Check for water leaks around the element flange.
9. Conduct an electrical insulation test. (Refer to page 23)
10. Replace access cover securely and restore electrical supply.

Exploded View - Single Element Models



Exploded View - Twin Element Models



Replacement Parts List – 45L & 50L

Item	Description	661045	661050 671050 691050	691G50	661050F 671050F
1	Fitting Liner	Not fitted	Not fitted	Not fitted	Not fitted
2	Inlet Diffuser	220516	220516	220516	225304
4	Extension Fitting	Not fitted	Not fitted	069405	Not fitted
5	Pipe Seal (Pre April 03)	N/A	221398-1	N/A	N/A
	Pipe Seal (From April 03)	221409	221398-1	221409	221392-1
7	Access Cover	100703-1	100780	100783	100784
9	Thermostat Cover	226921	226921	226921	226921
10	Element Screw	051404	051404	051404	051404
11	Element (Copper) - 1.2kW	050215	050215	050215	050215
	Element (Copper) - 1.8kW	050213	050213	050213	050213
	Element (Copper) - 2.4kW	050212	050212	050212	050212
	Element (Copper) - 3.0kW	050211	050211	050211	050211
	Element (Copper) - 3.6kW	050210	050210	050210	050210
	Element (Copper) - 4.8kW	050209	050209	050209	050209
12	Thermostat Clamp	102501	102501	102501	102501
13	Element Gasket	050704	050704	050704	050704
14	Thermostat	052013	052013	052013	052013
15	Terminal Block	051521	051521	051521	051521
16	Jacket Bottom (Pre April 03)	N/A	100644-1	N/A	N/A
	Jacket Bottom (From April 03)	100600	100453-1	100526-1	100457
20	T&PR Valve (1400kPa)	220610	220610	220644	220610
NI	Insulation T&PR valve	090150	Not fitted	Not fitted	090150
21	Pipe Seal (Pre April 03)	N/A	221398-1	N/A	N/A
	Pipe Seal (From April 03)	221411	221297-1	221411	221314
22	Jacket Top (Pre April 03)	N/A	100649-1	N/A	N/A
	Jacket Top (From April 03)	100651	100624-1	100622-1	100624-1
23	Anode – Black	221913	221908	221908	221903
	Anode – Blue	221943	221928	221928	221943
	Anode – Green	222013	222012	222012	222013
24	Anode Cover	221720-1	221720-1	221720-1	221720-1
25	Name Band (left hand)	N/A	120434	N/A	120444
	Name Band (right hand)	N/A	120435	N/A	120444
	Name Band (dual handed)	120449	120444	120444	N/A
26	Dip Tube (Outlet)	225601	225601	225601	225601
N.I	Cord Set – 10 amp	890244	890244	890244	890244
N.I	Installation kit	290139	290133	290138	290132

N.I – Not illustrated

Replacement Parts List – 80L, 125L & 160L

Item	Description	80L	125L	160L
1	Fitting Liner	221001	221001	221001
4	Extension Fitting	069405	069405	069405
5	Pipe Seal – Inlet/Outlet (Pre April 03)	221404-1	221404-1	221404-1
	Pipe Seal – Inlet/Outlet (From April 03)	221409	221409	221409
7	Access Cover	100703-1	100703-1	100703-1
9	Thermostat Cover	226921	226921	226921
10	Element Screw	051404	051404	051404
11	Element (Copper) - 1.2kW	050215	050215	050215
	Element (Copper) - 1.8kW	050213	050213	050213
	Element (Copper) - 2.4kW	050212	050212	050212
	Element (Copper) - 3.0kW	050211	050211	050211
	Element (Copper) - 3.6kW	050210	050210	050210
	Element (Copper) - 4.8kW	050209	050209	050209
	Element (Copper) - 6.0kW	N/A	050208	050208
12	Thermostat Clamp	102501	102501	102501
13	Element Gasket	050704	050704	050704
14	Thermostat	052012	052012	052012
15	Terminal Block	051521	051521	051521
16	Jacket Bottom (Pre April 2003)	100643-1	100643-1	100643-1
	Jacket Bottom (From April 2003)	100600	100600	100600
20	T & PR Valve (H.T.E 1400kPa)	220644	220644	220644
21	Pipe Seal – T & PR (Pre April 2003)	221408-1	221408-1	221408-1
	Pipe Seal – T & PR (From April 2003)	221411	221411	221411
22	Jacket Top (Pre April 2003)	100648-1	100648-1	100648-1
	Jacket Top (From April 2003)	100651	100651	100651
23	Anode – Black	221913	221914	221915
	Anode – Blue	221943	221924	221925
	Anode – Green	222013	222014	222015
24	Anode Cover	221720-1	221720-1	221720-1
25	Name Band	120425	120425	120425
	Name Band RH	120426	120426	120426
26	Dip Tube (Outlet)	225601	225601	225601
N.I	Cord Set – 10 amp	890244	N/A	N/A

Replacement Parts List - 250L, 315L & 400L

Item	Description	250L	315L	400L
1	Fitting Liner (Pre Jan 2004)	221001	221001	221001
2	Inlet Diffuser (From Jan 2004)	Not fitted	Not fitted	220516
4	Extension Fitting	069405	069405	069405
5	Pipe Seal – Inlet/Outlet	221404-1	221404-1	221404-1
7	Access Cover (Bottom – 661 Series)	100703-1	100703-1	100703-1
	Access Cover (Bottom – 662 Series)	N/A	100779	100779
9	Thermostat Cover – Bottom	226921	226921	226921
10	Element Screw	051404	051404	051404
11	Element (Copper) - 1.2kW	050215	050215	050215
	Element (Copper) - 1.8kW	050213	050213	050213
	Element (Copper) - 2.4kW	050212	050212	050212
	Element (Copper) - 3.0kW	050211	050211	050211
	Element (Copper) - 3.6kW	050210	050210	050210
	Element (Copper) - 4.8kW	050209	050209	050209
	Element (Copper) - 6.0kW	050208	050208	050208
12	Thermostat Clamp	102501	102501	102501
13	Element Gasket	050704	050704	050704
14	Thermostat Bottom	052012	052012	052012
15	Terminal Block (661 Series)	051521	051521	051522
	Terminal Block (662 Series)	N/A	051507	051507
16	Jacket Bottom	100642-1	100642-1	100641-1
17	Access Cover (Top – 662 Series)	N/A	100704-1	100704-1
18	Thermostat Cover – Top (662 Series)	N/A	226921	226921
19	Top T/stat – 662 Series (Non-simultaneous)	N/A	052018	052018
20	T & PR Valve (H.T.E 1000kPa)	220641	220641	220641
21	Pipe Seal – T & PR	221408-1	221408-1	221408-1
22	Jacket Top	100647-1	100647-1	100646-1
23	Anode – Black	221914	221915	221938
	Anode – Blue	221924	221925	221947
	Anode – Green	222014	222015	222015
24	Anode Cover	221720-1	221720-1	221720-1
25	Name Band	120427	120427	120427
26	Dip Tube (Outlet)	225601	225601	225601

Vulcan Water Heater Warranty

Australia Only

WARRANTY CONDITIONS

1. This warranty is applicable only to Vulcan water heaters manufactured from 1st January 2001.
2. The water heater must be installed in accordance with the Vulcan water heater installation instructions, supplied with the water heater, and in accordance with all relevant statutory and local requirements of the State in which the water heater is to be installed.
3. Where a failed component or water heater is replaced under Warranty, the balance of the original period will remain effective. The replaced part or water heater does not carry a new warranty.
4. Where the water heater is installed outside the boundaries of a metropolitan area as defined by Rheem Australia or further than 25 km from a regional Rheem Australia branch office, or an Accredited Service Agent, the cost of transport, insurance and travelling costs between the nearest Rheem Australia Accredited Service Agent's premises and the installed site shall be the owner's responsibility.
5. The warranty only applies to the water heater and original or genuine company component replacement parts and therefore does not cover any plumbing or electrical parts supplied by the installer and not an integral part of the water heater, e.g. pressure limiting valve; isolation valves; non-return valves; electrical switches; pumps or fuse.
6. The water heater must be sized to supply the hot water demand in accordance with the guidelines in Vulcan water heater literature.

WARRANTY EXCLUSIONS

1. REPAIR AND REPLACEMENT WORK WILL BE CARRIED OUT AS SET OUT IN THE VULCAN WATER HEATER WARRANTY ABOVE, BUT THE FOLLOWING EXCLUSIONS MAY CAUSE THE WATER HEATER WARRANTY TO BECOME VOID, AND MAY INCUR A SERVICE CHARGE AND COST OF PARTS.
 - a) Accidental damage to the water heater or component including: Acts of God; failure due to misuse; incorrect installation; attempts to repair the water heater other than by a Rheem Australia Accredited Service Agent or the Rheem Australia Service Department.
 - b) Where it is found there is nothing wrong with the water heater; where the complaint is related to excessive discharge from the temperature and pressure relief valve due to high water pressure; where there is no flow of hot water due to faulty plumbing; where water leaks are related to plumbing and not the water heater components; where there is a failure of gas, electricity or water supplies; where the supply of gas, electricity or water does not comply with relevant codes or acts.
 - c) Where the water heater or water heater component has failed directly or indirectly as a result of: excessive water pressure, temperature and/or thermal input or corrosive atmosphere.
 - d) Where the water heater is located in a position that does not comply with the Vulcan water heater installation instructions or relevant statutory requirements, causing the need for major dismantling or removal of cupboards, doors or walls, or use of special equipment to bring the water heater to floor level.
 - e) Repairs to the water heater due to scale formation in the waterways when the water heater has been connected to a harmful water supply as outlined in the Owner's Guide and Installation Instructions booklet.
2. SUBJECT TO ANY STATUTORY PROVISIONS TO THE CONTRARY, THIS WARRANTY EXCLUDES ANY AND ALL CLAIMS FOR DAMAGE TO FURNITURE, WALLS, FOUNDATIONS OR ANY OTHER CONSEQUENTIAL LOSS EITHER DIRECTLY OR INDIRECTLY DUE TO LEAKAGE FROM THE WATER HEATER.

In addition to this warranty, the Trade Practices Act 1974 and similar laws in each state and territory provide the owner under certain circumstances with certain minimum statutory rights in relation to your Vulcan water heater. This warranty must be read subject to that legislation and nothing in this warranty has the effect of excluding or restricting those rights.

RHEEM AUSTRALIA
RHEEM AUSTRALIA PTY. LTD.
A.B.N 72 004 213 665

FOR SERVICE TELEPHONE
131 031 AUSTRALIA
or refer local Yellow Pages

NOTE: Every care has been taken to ensure accuracy in preparation of this publication. No liability can be accepted for any consequences, which may arise as a result of its application.

Document Revision History

Title: Vulcan Electric Service Instructions	Document Number: TM013
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Revision	Details of change	D.O.I.
A	Service Instructions issued for Vulcan Electric Models	14/11/01
B	Format update & conversion from Southcorp to Rheem	21/2/05
C	50L F models added	3/3/06
D	45L model added	25/5/09